PIER –Environmental Area

- **Avian Research Program Transmission-Distribution Line Issues**

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June 28, 2005

Distribution and Transmission System Cause Electrocutions and Collisions

- Electrocutions on poles when birds contact energized phase to phase or energized phase to ground components
  - May result in outage
  - > 6.5 Million distribution poles in California
- Collisions with conductors

  Often undetected
  - ~32 k miles of transmission line in California

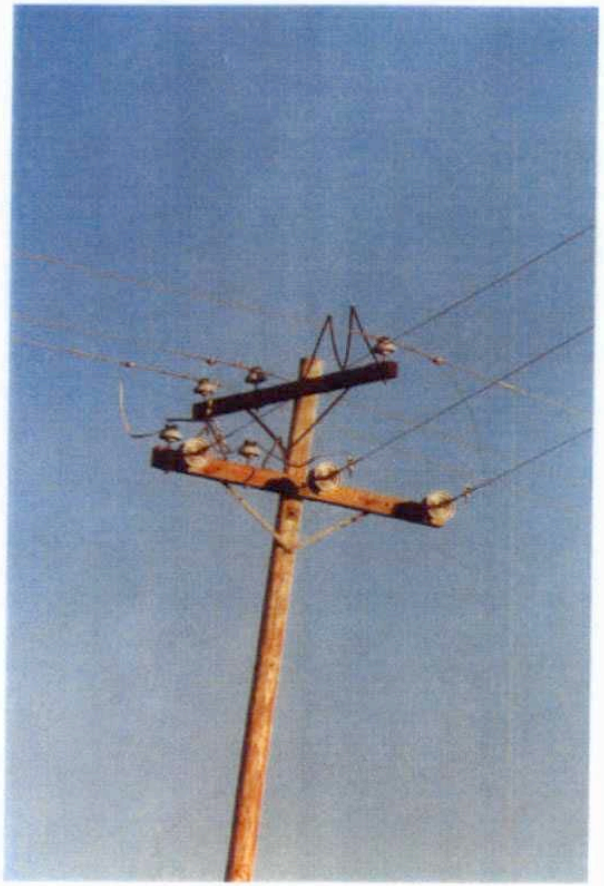
Costs to birds and utilities

- Extent of Fatalities Unknown ~ 1000's/yr
- No Standardized Reporting Requirements
- 25% Outages (PG&E)
- 1/3 Maintenance Costs
- Mitigation is pole specific –time/costs

Research Needs

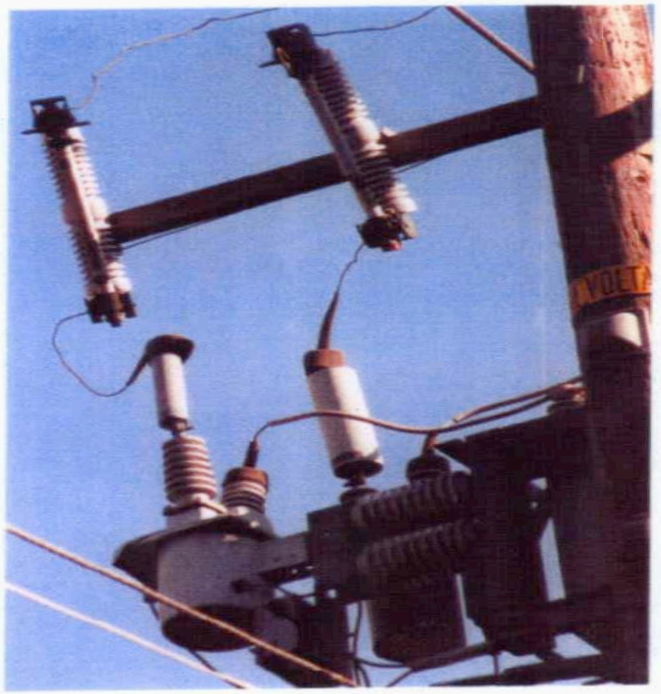
- Risk Assessment
- Risk Reduction
- Monitoring
- Technology Transfer

Study w/PG&E to Evaluate Retrofitting



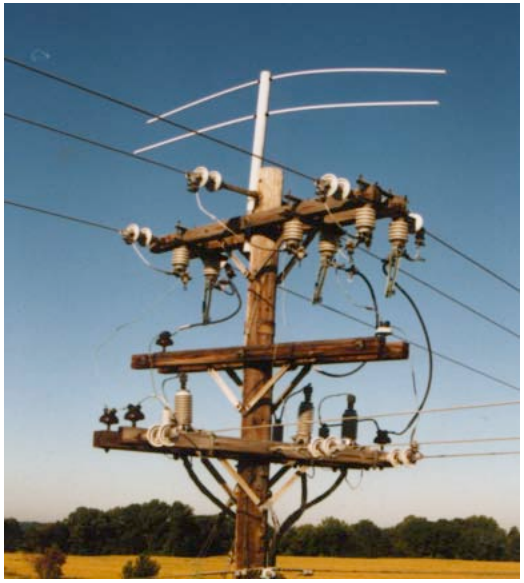
Homemade Triangular Perch Guard Installed on Wrong Side of Upper Crossarm

- 15% Degraded
- 65% Installed incorrectly



Bushing Cover Installed Above the Bushing-Mounted Cutout

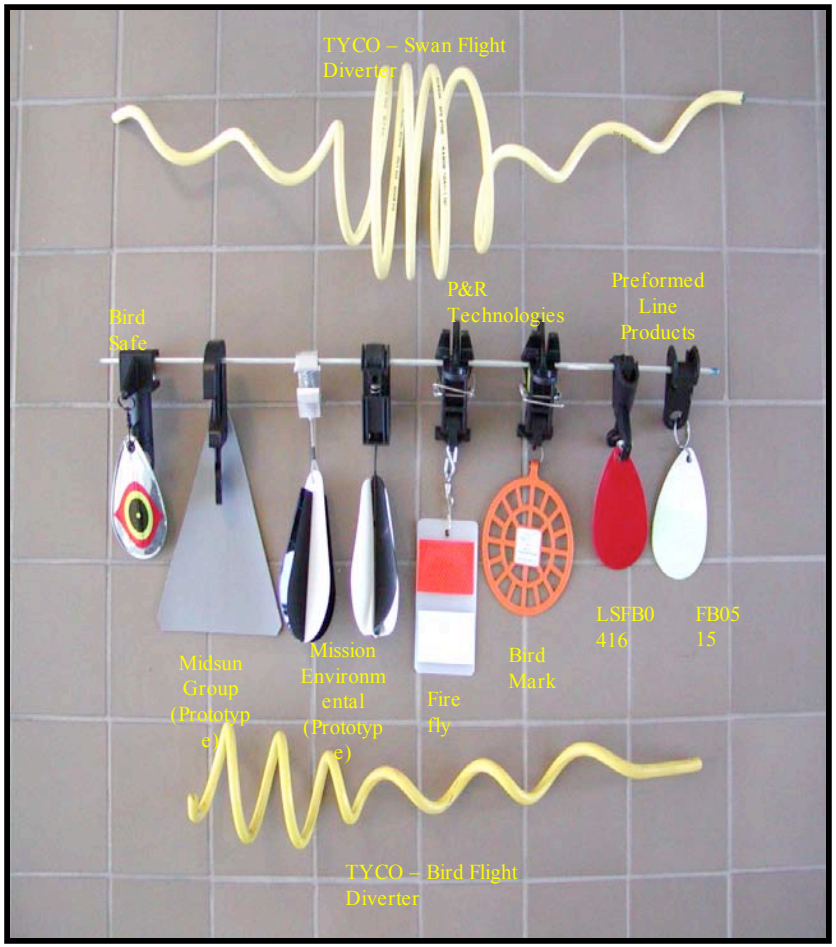
Risk Assessment and Risk Reduction



- **Distribution System**
  - Evaluate Effectiveness of Retrofitting - USGS
  - Risk Predictive Models - PG&E/SCE
  - Effectiveness of Flight Diverters – CSU Sac

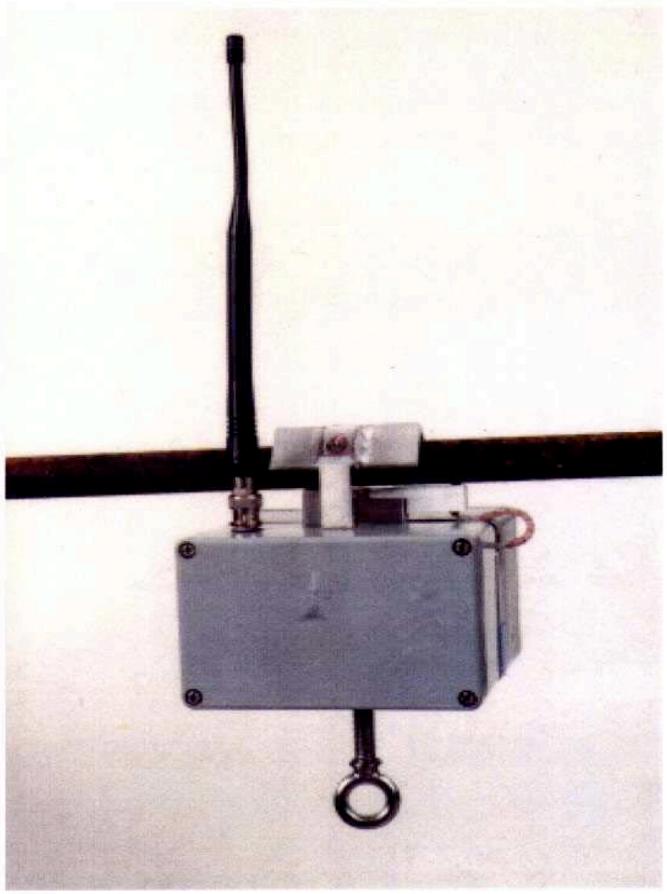
Testing durability of diverters

- Evaluate effect of Corona - voltage is raised so the surrounding air is ionized and conductive
- Sharp corners and uneven surfaces can be source of corona emission
- All generated corona at 230 kV
- Only one device damaged
- Non-swing type had no detected corona



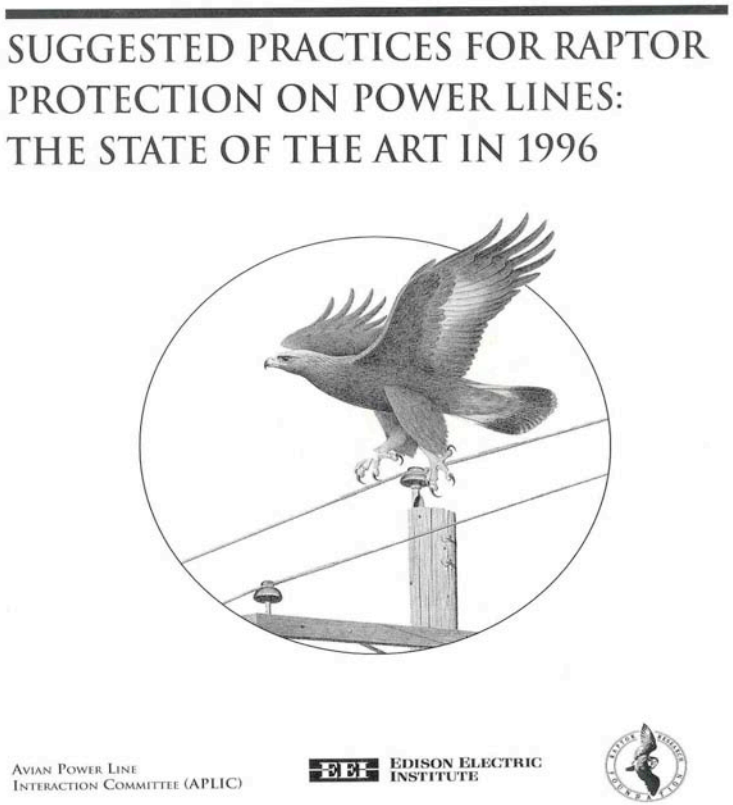
Technology to Reduce Time/Costs

- Bird Strike Indicator
  - Automated devise to record bird strikes in field
  - EPRI, WAPA, Utilities, EDM International, Inc



Bird Strike Monitor

Technology Transfer



Revising and Updating "Suggested Practices for Raptor Protection on Powerlines: The State of the Art in 1996"

Technology Transfer

- Bird Electrocution Mitigation Web Site and Product Encyclopedia – EDM, International, Inc

Bird Electrocution Mitigation Website - Microsoft Internet Explorer

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Address http://bems.ednilink.com/secure/Retro01.asp Go Links

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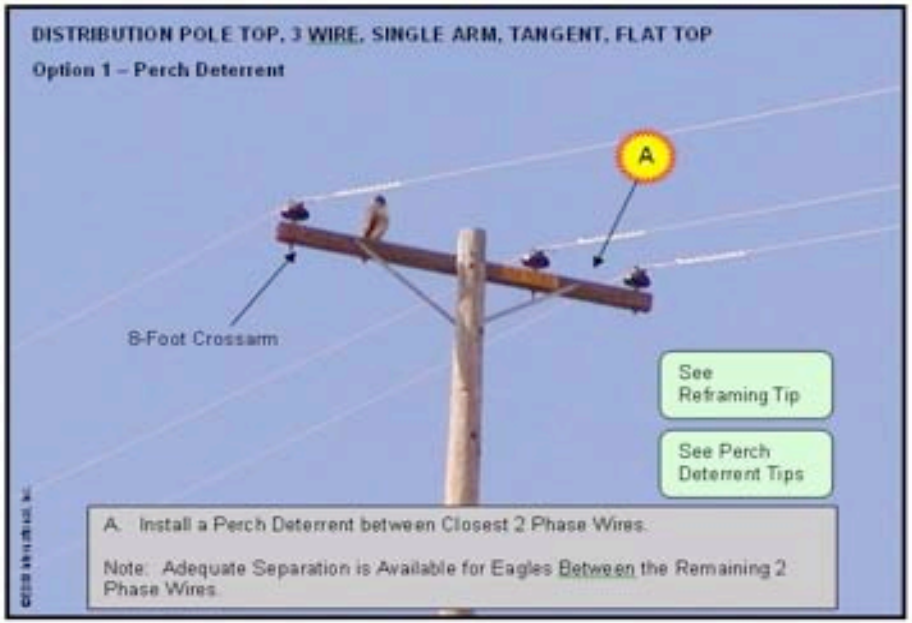
Retrofitting Solution 1

NEXT>

Click the A to see products for this application.



Click the buttons for tips to help make your job go smoothly.

Bird Electrocution Mitigation Website Product Effectiveness - Microsoft Internet Explorer

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Product Effectiveness

The following is a list of measures employed by utilities to mitigate distribution overhead animal contacts. The table results are based on a utility survey. Each utility reviewed the list and graded the effectiveness of each measure applying the following grades: **A. Excellent B. Very Good C. Good D. Poor F. Failed**

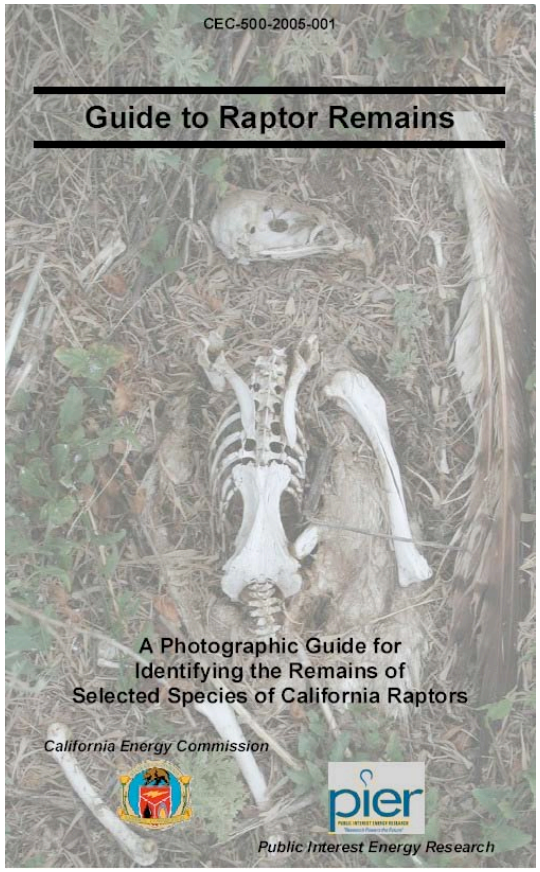
Utilities also graded their satisfaction with each product's long-term durability. The table provides a tabulation of the number of utilities employing each measure and an averaged grade.

It is important to note these utility rankings are for a class of product (e.g., bushing covers, conductor guards, perch guards, etc.) and **NOT** for specific vendor products. This section will be updated as utilities provide additional feedback.

Ranking of Mitigating Measures used on Distribution Overhead Facilities.

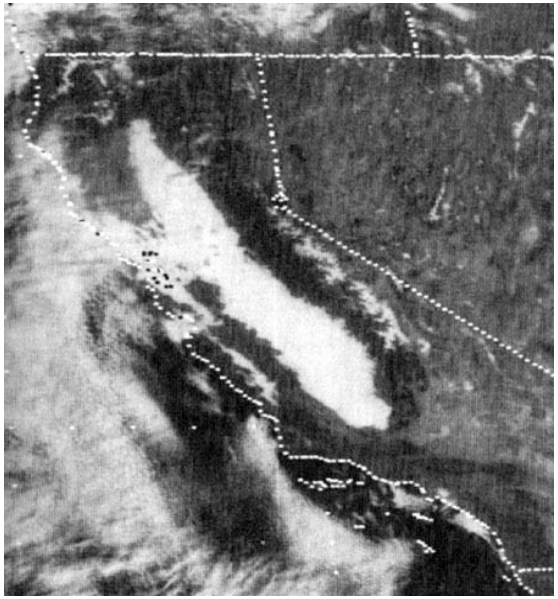
Mitigating Measures to Reduce Animal Contacts	No. Utilities	Mitigation Success A B C D F	Long-Term Durability A B C D F
Insulating Measures			
Wood/Fiberglass Insulated Equipment Mounts	17	B	B
Bushing Covers	54	B	C
Insulated Jumper/Stinger Wires	47	B	B
Insulated Primary Wire	11	B	B
Heat-Shrink Insulation Material	10	B	B
Insulating Tape	12	B	C
Insulating Paint	2	B	B
Insulating Spray	1	C	C
Stirrup Covers	2	B	B

Technology Tranfer



"Raptor Mortality Field Guide" – EDM International, Inc

Avian Collision Not Well Studied



- Nationally ~ unknown
- CA, unknown
  - Mare Island: 313/mi/yr
  - 5K miles lines in CV
  - 5.5M wintering ,8K breeding waterfowl
  - potential 300K/yr

Thank you!

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